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EXAMINER'S ANSWER

This is in response to the appeal brief filed January 7, 2009 appealing from the Office action mailed February 6, 2008.

Examiner's Answer dated July 24, 2009 under the heading "Grounds of Rejection" was not consistent with the grounds of rejection of claims set forth in last Office Action of Record. Examiner inadvertently did not include claims 21-26. The correct Grounds of Rejection are claims 11-26 which is now reflected in correspondence below and consistent with the grounds of rejection of claims set forth in last Office Action of Record.

Examiner's Answer dated July 24, 2009 has been vacated and revised Examiner's Answer is shown below.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The Appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

Claims after final has been filed, but no amendments were made. After final communications were entered only to have Terminal Disclaimer entered and reviewed. Terminal Disclaimer was filed and approved in view of obviousness-type double patenting rejection over US 2006/0167288 A1 (10/534,299) in view of Gilbeau (US 6,063,941). Thus, the obviousness type double patenting rejection is withdrawn.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,288,248 B1	STREBELLE	09-2001
JP 04327582	FUKUDA(Takehisa)	11-1992
6,063,941	Gilbeau	05-2000

Note: An official translation of JP 04327582 is attached.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 11-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strebelle et al (US 6,288,248 B1) in view of Nakanishi et al (JP 04327582) and in further view of Gilbeau at al (US 6,063,941).

The instant application claims a process for the manufacture of 1,2-epoxy- 3-chloropropane (epichlorohydrin) as described above.

Strebelle et al teach a process for the manufacture of 1,2-epoxy-3-1-chloropropane (epichlorohydrin) by reaction of allyl chloride with a peroxide compound in the presence of a TS-1 catalyst and a solvent such as methanol (see column 1, line 5 to column 3, line 33). Strebelle et al teaches that the peroxide compound which can be used in their invention can be chosen from hydrogen peroxide and any peroxide containing an active oxygen and capable of carrying out an epoxidation (see column 2, lines 29-36). Strebelle et al also teaches that the molar ratio of allyl chloride and hydrogen peroxide can vary within a wide range, but is usually less than or equal to 10, particularly to 41 (see column 2, lines 49-53). Strebelle et al discloses temperature

ranges can very within a very a wide range, but usually between 0° and 120°C (see column 3, lines 2-10) and the catalyst is present in the form of a fluid bed (see column 6, lines 14-15). Strebelle et al discloses all of the claimed limitations except the use of an allyl chloride comprising less than 2000 ppm by weight of 1,5-hexadiene.

Nakanishi et al teaches a process for preparation of 1,2-epoxy-3- chloropropane (epichlorohydrin) which is analogous to the claimed process. Nakanishi teaches in this process, it is desirable to utilize an allyl chloride comprising 1,5-hexadiene content below 0.1% weight % (1000 ppm). The 1,5- hexadiene is converted to the by-product, 1,2-epoxy-5-hexene, by oxidation (see WPIDS abstract), which cannot be separated from epichlorohydrin by distillation. Thus, the process of Nakanishi allows one to prepare high purity epichlorohydrin more efficiently.

It is well known in the art that it is advantageous to control acidity of this reaction at a pH range of, preferably, 2 to 8 as described by Gilbeau et al (see entire disclosure in particular column 3, lines 34-53).

One of ordinary skill in the art at the time of the invention was made would have been motivated to utilize an allyl chloride having a 1,5-hexadiene content below 0.1 weight % (1000 ppm), as taught by Nakanishi along with the pH range as taught by Gilbeau et al, in the process of Strebelle et al because it would allow the preparation of 1,2-epoxy-3-chloropropane (epichlorohydrin) of Strebelle et al without formation of the unwanted by-product, 1,2-epoxy-5-hexene, which would form as a result of the oxidation of the 1,5-hexadiene by the peroxide used in the epoxidation of allyl chloride.

The Examiner believes that the teaching of Nakanishi is properly combinable with the teaching of Strebelle et al because they are directed toward analogous subject matter- epoxidation of an allyl chloride with a peroxide and both seek to solve a similar problem in the art - generation of undesirable by\- products which are difficult to remove from 1,2-epoxy-3-chloropropane (epichlorohydrin).

(10) Response to Argument

A. The Appellants argue that "it is well known in the art that it is advantageous to control acidity of this reaction at a pH rang of, preferably, 2 to 8 as described by Gilbeau" and that Examiner erroneously concluded that it would have been obvious to a person having ordinary skill in the art in view of the combined prior art teachings.

Appellant further argues that nowhere in the references of Strebelle nor Nakanishi does it indicate that pH is a factor in a process for the production of 1,2-epoxy-3-chloropropane (epichlorohydrin) and that Examiner only relies on Gilbeau purported teachings of pH being a factor.

Examiner disagrees. Strebelle clearly discloses the affect of an acid (pH) would have on the catalyst for re-use and regeneration of the catalyst. In an analogous process, Strebelle states that it would be advantageous to regenerate the catalyst by treatment with a solution comprising an oxidizing agent such as hydrogen peroxide, ozone or an organic peroxide (see column 3, lines 34-43). Strebelle clearly suggests

that acidity does affect the catalyst which is an important part of the production of 1,2-epoxy-3-chloropropane (epichlorohydrin).

Examiner uses the reference of Gilbeau as support for the adjustment of pH in the production of 1,2-epoxy-3-chloropropane (epichlorohydrin). Again, in this analogous process, Gilbeau states that it is advantageous to control the pH in order to positively affect the activity of the catalyst (see column 3, lines 29-66, more specifically lines 29-43).

Appellant argues that Gilbeau describes a process for the regeneration of catalyst. Examiner agrees. Gilbeau clearly describes the affect of pH on the catalyst. This is Appellant's purpose for pH adjustment in the instantly claimed invention. In absence of pH control, the catalyst will not provide optimal epoxidation condition which can result in poor selectivity and significant formation of undesirable by-products.

As stated clearly in previous Office Actions, the claimed pH range of 1.5 to 4.8 falls well within the range as taught by Gilbeau (pH 2 to 8).

B. Appellant argues that prior art teaches away from Appellant's invention. Appellant also recites the teachings of references: WO/99/48882, EP 1,072,600 and EP 1,085,017, specifically taught away from Appellant's invention. Examiner has properly made a prima facie case of obviousness as being unpatentable over Strebelle et al (US 6,288,248 B1) in view of Nakanishi et al (JP 04327582) and in further view of Gilbeau at al (US 6,063,941).

Appellant argues that Examiner erred in granting no weight to showing of unexpected results in the Specification. Examiner believes that results in the present are obvious to one of ordinary skill in the art and regarding the optimization of adjusting the pH that it is well within the purview of the skilled artisan.

The affidavit under 37 CFR 1.132 filed on July 7, 2008 is insufficient to overcome the rejection of claims 11-26. Appellant's results are as follows:

TABLE 1

Time (h)		Example 1 With regulation	Example 2 Without regulation
25	Conversion (%)	95.3	96.9
	EPI/C3f selectivity (%)	96.9	93.7
50	Conversion (%)	89.3	92.1
	EPI/C3f selectivity (%)	97.2	94.3
78	Conversion (%)	83.3	85.1
	EPI/C3f selectivity (%)	97.4	94.4

TABLE 2

	Example 3 T°: 65° C. With pH regulation	Example 4 T°: 55° C. Without pH regulation
Degree of conversion H_2O_2 (%)	92.0	92.2
EPI/C3f selectivity (%)	96.3	94.4
Time (h)	395	53

Appellant compares Examples 1 and 3 (with adjustment of the pH) with Examples 2 and 4 (without adjustment of pH). Appellant alleges "unexpected" results

regarding the regulation of pH. Examiner has review that data and have considered Appellant arguments and does not recognized any significant differences of conversion between Examples 1 and 3 (with adjustment of the pH) and Examples 2 and 4 (without adjustment of pH). The only significant difference shown is the time differences of Examples 3 and 4. Example 4 (without pH regulation) actually shows a decrease in reaction time (53 h) without a significant difference in degree of conversion and selectivity as compared to Example 3 (with pH regulation). One of ordinary skill in the art would consider Example 4 - without pH regulation - to be advantageous.

Appellant argues that in obviousness rejection of Strebelle in view of Nakanishi and Gilbeau in not commensurate in scope with the subject of the matter claimed and/or is inconsistent with the teaching of the Specification.

Examiner maintains that the temperature range of 45 to 80^{o}C (dependent claim 15) was properly addressed in previous Office Actions. In Non-Final Office Action dated August 9, 2007, Examiner addressing the temperature limitation as claimed by instant invention (top of page 10).

Strebelle et al also teaches that the molar ratio of allyl chloride and hydrogen peroxide can vary within a wide range, but is usually less than or equal to 10, particularly to 4. (see column 2, lines 49-53). Strebelle et al discloses temperature ranges can very within a very a wide range, but usually between 0° and 120°C (see column 3, lines 2-10) and the catalyst is present in the form of a fluid bed (see column 6, lines 14-15).

The temperature limitation as disclosed by Strebelle is clearly addressed in the obviousness rejection and in commensurate in scope with the subject matter as claimed. Strebelle actually discloses an even narrower temperature range of 20 to 80°C which encompasses the claimed temperature as claimed (45 to 80°C). Examiner maintains that the obviousness rejection of recorder (Strebelle in view of Nakanishi and Gilbeau) is clearly commensurate in scope with the subject of the matter claimed.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the Examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

/John Mabry/

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